Advanced Technology Review Board

SUCCESS STORIES

Summary: ATRB Success Stories

Technology	Transition
Fiber Optic Switches	Transitioning into production AESA radar for the F/A-18E/F Lot 27 Provides risk reduction for radar high speed interface Successful adaptation of commercial fiber optic technology to military aviation application
Fiber Optic Networks	Technology demonstrated on EA-6B Simultaneous transmission of digital and RF signals on same fiber optic lines Highly Integrated Photonics (HIP) will test technology advances on EA-6B Production transition candidate for EA-18G, MMA, JSF (originally submitted to PMA-265)
PCMCIA-Commercial PCMCIA cards militarized for use in a/c & support equipment	Transitioned to all models of F/A-18 POM 06 request pending for solution to mass storage requirement Used for TAMMAC data loading
AMLCD-Active Matrix Liquid Crystal Displays	Transitioned to F/A-18 E/F Used for 3x5 displays and F/A-18F 8x10 rear cockpit display

Summary: ATRB Success Stories (cont'd)

Technology	Transition
Software Engineering Tools HOL(C++00)(Parts of several ATRB proposals were included in upgrade)	F/A-18
Optical Backplane (OBIS)	JSF (has also flown on EA-6B; originally submitted to F-18 ATRB)
Digital Precision Strike Suite (DPSS)-originally submitted to Weapons ATRB	F-14 (originally submitted to F-18 ATRB)
Composite Rocket Motor Case	IMTTP & Mantech for flight demo on F/A-18. Potential AIM-9X upgrade in 08-09. Will transition to Joint Common Missile.
DAMASK	ATA technology transitioned to JSOW-C Used as ATA algorithm for DPSS and PSS-SOF (originally submitted to F-18 ATRB)
Ball Joint Gimbal Originally targeted for JSOW P3I (still a candidate)	Real Time Retargeting Demo for Tactical Tomahawk AARGM Active MMW Seeker with PMA 242 TERM anti tank round with Raytheon/Army Low Cost Seeker Candidate for SLAM-ER Originally endorsed by PMA-201 for JSOW (still a candidate) at the first Weapons ATRB in 1998 - now on 4 other systems

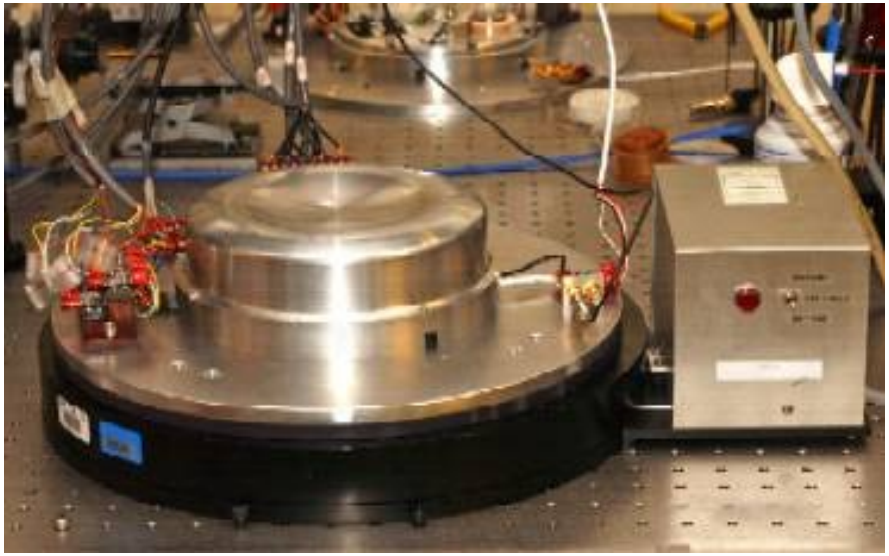
Summary: ATRB Success Stories (cont'd)

Technology	Transition
Precision Strike Navigator	Candidate to receive Rapid Technology Transfer funding to accelerate development schedule Transition planned for JSOW Block II production scheduled for 2008
Anti-Jam GPS Fixed Reception Pattern Antenna	Transition to Phase III SBIR in 2003. Phase III objective is to further reduce cost of the GPS system by reducing part count. Under consideration for JSOW Block II as a risk reduction alternative.
Topological Matched Filter	Integration and testing in P3C ACAP program
Intensified Photo-Diode Detector	Realtime demo in LADAR mine detection system
Photo-reflective Filter	Integration and testing in P3C mine detection system
Passive and Active Bistatic Acoustic Target I.D.	Integration and testing in P3C ACAP program
C2 Cavitation Detection	Integration and testing in standalone P3C processor
Detection/Classification of LF/MF Signals	Integration and testing in standalone P3C processor
Air ASW SXXX Detector	Integration and testing in standalone P3C processor

Details of Transitioned Technologies

Additional information on transitioned technologies will be added as it becomes available.

ATRB Success Story:
Precision Strike Navigator



ATRB Origin: WATRB I October 1998

Transition successes:

- Candidate to receive Rapid Technology Transfer funding to accelerate development schedule
- Transition planned for JSOW Block II production scheduled for 2008

Description:

- The Precision Strike Navigator (PSN) is high level hybrid, Fiber Optic Gyro (FOG) based, Inertial Measurement Unit (IMU) chip containing the accelerometer, FOG optics and all of the IMU electronics on a silicon wafer. The hybridization will allow for high accuracy performance at a price appropriate for tactical weapons.

ATRB Success Story: PCMCIA Card

ATRB Origin: F/A-18 ATRB II 2/18/1998

Transition successes:

- Transitioned to all models of F/A-18
- Used for TAMMAC data loading
- POM 06 request pending for solution to mass storage requirement

Description:

- Commercial off-the-shelf credit card sized data storage/loader for avionics computers; “credit card size” – standard. Mass storage application will use gang of cards.

ATRB Success Story: Fiber Optic Switch

ATRB Origin: SPATRB I July 2000

Transition successes:

- Transitioning into production AESA radar for the F/A-18E/F Lot 27
- Provides risk reduction for radar high speed interface
- Successful adaptation of commercial fiber optic technology to military aviation application
- Technology transitioned previously to the EA-6B

Description:

- Fiber Optic technology provides very high scaleable bandwidth (Unachievable with wire), lower vehicle weight and less volume required for signal line harnesses, freedom from design concerns of fires, short circuits and ground loops, as well as immunity to upset from external electromagnetic interference while providing security from external eavesdropping.

ATRB Success Story: Fiber Optic Network

ATRB Origin: SPATRB I August 2000

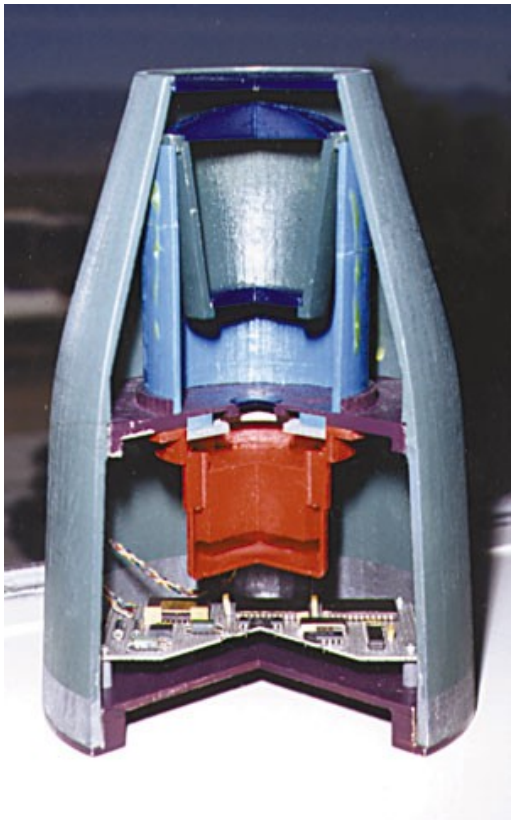
Transition Successes:

- Technology demonstrated on EA-6B
- Simultaneous transmission of digital and RF signals on same fiber optic lines
- Highly Integrated Photonics (HIP) will test technology advances on EA-6B
- Production transition candidate for EA-18G, MMA, JSF

Description:

- Broadband photonic network with very high scalable bandwidth
- Simultaneously transmit many channels of high bandwidth analog and digital data
- Wave division multiplex (WDM) divides the bandwidth of a single mode fiber into many channels

ATRB Success Story: Direct Attack Munition Affordable Seeker (DAMASK)



ATRB Origin: Weapons ATRB I Fall 1998
(originally submitted to F-18 ATRB)

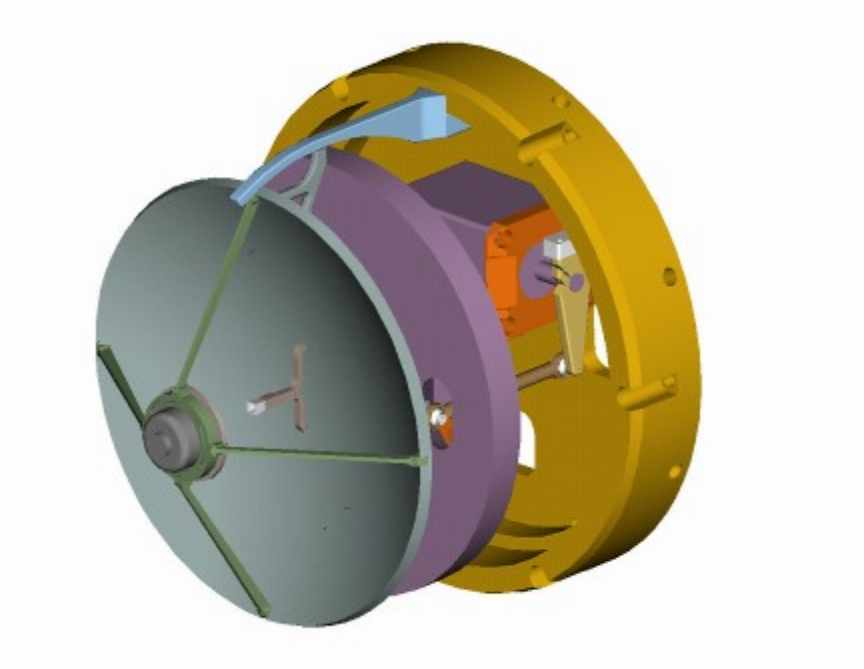
Transition Successes:

- DAMASK Automatic Target Acquisition (ATA) technology transitioned to JSOW-C
- Used as ATA algorithm for DPSS and PSS-SOF

Description:

- Improved precision guided weapon CEP through:
- Uses a strap down IR seeker
- Automatic target acquisition algorithm compares seeker imagery to a template downloaded to the weapon from the aircraft prior to launch

ATRB Success Story: Ball Joint Gimbal



ATRB Origin: WATRB I 10/15/1998

Transition successes:

- Real Time Retargeting Demo for Tactical Tomahawk
- AARGM Active MMW Seeker with PMA 242
- TERM anti tank round with Raytheon/Army
- Low Cost Seeker Candidate for SLAM-ER
- Originally endorsed by PMA-201 for JSOW (still a candidate) at the first Weapons ATRB in 1998 - now on 4 other systems

Description:

- Ball Joint Gimbal is a precision gimbal system
- providing accurate terminal guidance
- Provides a particle approach for reducing the cost and complexity of missile seekers (35-50%) while maintaining high performance
- Inherently low cost because it minimizes the use of mechanical components and maximizes the use of processing algorithms

ATRB Success Story: Active Matrix Liquid Crystal Displays

ATRB Origin: F/A-18 ATRB II February 1998

Transition successes:

- Transitioned in F/A-18E/F Lot 25
- Currently used for 3x5 displays and F/A-18F 8x10 rear cockpit display

Description:

- In AMLCDs, each display screen element is connected to a small thin film transistor that can switch a liquid crystal pixel from light to dark without "bleeding" voltage to the surrounding pixels. The resulting image exhibits superior speed, brightness, and contrast over other liquid crystal displays or cathode ray tubes (CRTs).

ATRB Success Story: Anti-Jam GPS Fixed Reception Pattern Antenna (FRPA)

ATRB Origin: WATRB VI-1 March 29, 2001

Transition Successes:

- Transition to Phase III SBIR in 2003. Phase III objective is to further reduce cost of the GPS system by reducing part count.
- Under consideration for JSOW Block II as a risk reduction alternative.

Description:

- Low cost, innovative approach to provide anti-Jam capability to GPS Antenna.
- Phase III will integrate the Antenna Interface Module (AIM) functionality into a single package.

ATRB Transition Success Stories In Progress

- **TADIRCM** POM'd for in 2006 by PMA-272, supported in POM by PMA-265 (no 265 funding). **2-Color IR Missile Warning Sensor Technology** POM'd as part of TADIRCM.
- **Expand 4/5** POM'd for in 2006 by PMA-265.
- **High Speed Optical Switch Technology** POM'd for in 2006 by PMA-265 (through AESA).
- **Advanced Tactical Targeting Technology (AT3)** POM'd for by PMA-265 EW IPT but funding disapproved. PMA-265 will revisit for POM '08 based on availability of Digital Cued Receiver. Also seeking CTTO and TCS FNC funding.

ATRB Transition Success Stories In Progress (cont'd)

- **Precision Terrain Aided Navigation (PTAN)** POM'd for in 2006 by PMA-280 but not yet funded.
- **Tactical Precision Guided Munitions Data File (TPDF)** POM'd for by PMA-201 (endorsed by PMA-265 in POM Figure of Merit list).
- **Dynamic Reconfiguration of Link-16** funded by SPAWAR.
- **Precision Strike Targeting Using The F/A-18 E/F APG-79 AESA Radar and/or the Shared Reconnaissance Pod (SHARP SAR) –** portions POM'd for in 2006 by PMA-265.
- **CL-20** explosives program received MANTECH approval and funding.

ATRB Transition Success Stories
In Progress (cont'd)

TCS FNC projects which have signed Technology Transition Agreements with NAVAIR PMAs:

- Hyperspectral Imaging System (PMA-265; also interest by PMA-263)
- Real-time Execution and Decision Support System (PMA-281; originally submitted to F-18 ATRB)
- Real-time Precision Targeting Radar (PMA-263; also interest by PMA-265)
- High Speed ARM Demo (PMA-242)
- Precision Strike Navigator (PMA-201)

ATRB Success Stories (cont'd)

- **ATRB process is a significant factor in stabilizing S&T funding for all projects with Support and Endorse ratings.**
  - **For example, 95% of ONR projects with endorse/support votes since 1997 are still being funded**
- **Projects from newer ATRB's (Common Systems, Assault, etc) are still in pipeline -- transitions pending.**